

USB

Universal Serial Bus

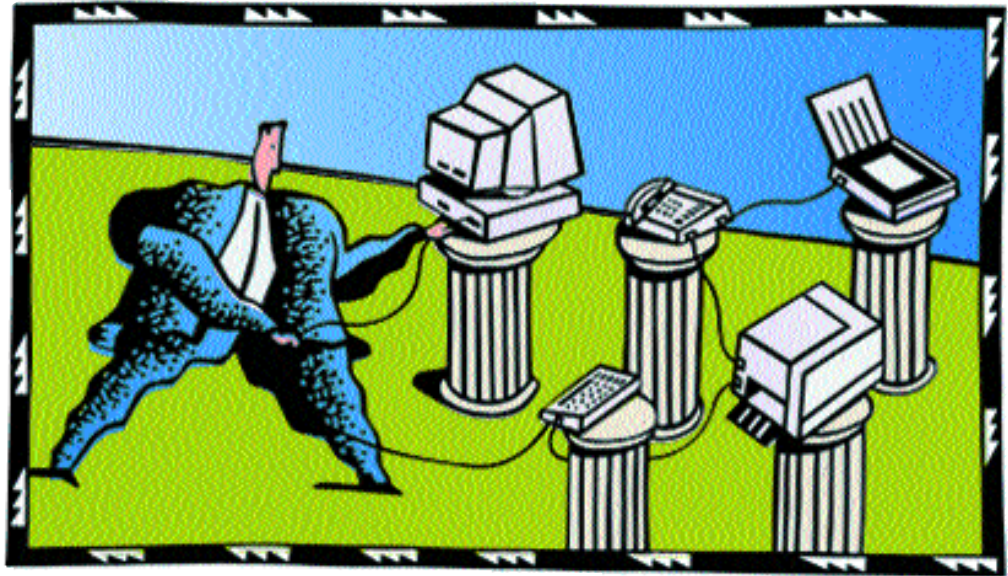
The Universal Serial Bus (USB) makes "outside-the-box" plug-and-play a reality, enabling users to increase the functionality of their PCs by easily adding multiple peripheral devices to one interface.

TECHNOLOGY PROVIDERS:

- Original Equipment Manufacturers
- Independent Hardware Vendors
- Independent Software Vendors
- Operating System Vendors

USER BENEFITS:

- Peripherals plug-and-play outside the PC
- Automatic configuration
- Lower cost for adding peripheral devices
- One connector fits all

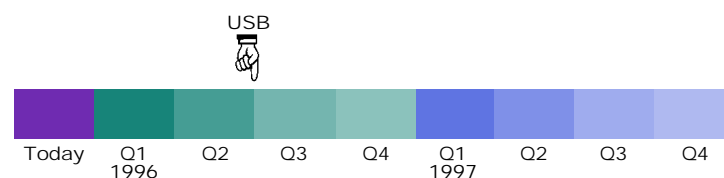


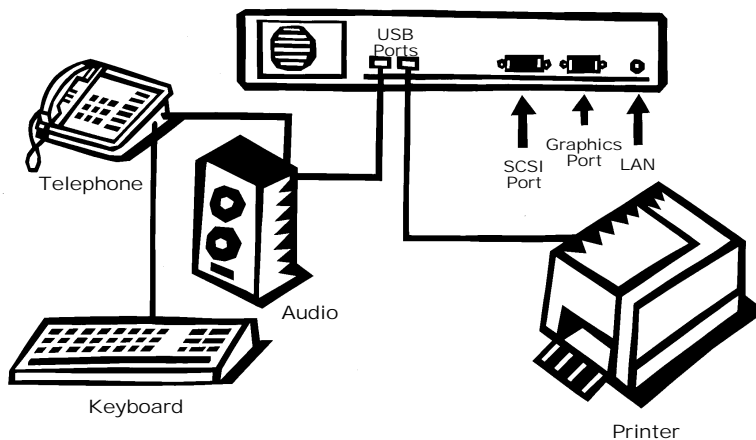
The port capacity of today's PCs is being pushed to its limits, as users seek to extend the functionality of their computers by adding an increasing array of peripheral devices. Since every peripheral device requires its own port, available expansion slots are quickly exhausted, limiting the ability to expand functionality to keep pace with changing computing needs. The traditional serial and parallel ports in a PC are not sharable between peripherals and are relatively low speed. Today, add-in cards are the only method for new devices that require high bandwidth. Even when add-in slots are available, users are still required to physically open up their computer and install

and configure the new board (a potentially daunting process that discourages many people from bothering to expand the performance of their PCs.)

The Universal Serial Bus (USB) has been defined to help solve the PC port shortage issue, while at the same time dramatically simplifying the job of adding devices. The USB initiative was started by Compaq, DEC, IBM, Intel Corporation, Microsoft, NEC and Northern Telecom. The USB Implementers Forum is now an industry association of over 200 companies worldwide that support USB. USB will allow users to add peripherals outside of the PC's shell, without installing or configuring add-in cards.

AVAILABILITY TIMELINE





How Does USB Work?

USB can support up to 127 peripheral devices with the same interface, without an add-in card. This functionality is part of the PCI "chipset" feature, and the OEM makes it available to the user by providing a USB connector at the back of the system. The physical interconnect is a tiered star topology. The manufacturer of USB peripherals typically will provide a connector to connect that device to the USB bus and a second connector on that device that can accept another USB peripheral. This will allow the user to add a number of devices.

USB's 12 Megabits per second (Mbps) data rate supports isochronous low-cost devices such as telephony, audio, etc. These types of devices require continuous data and cannot tolerate delays or interruptions. USB "guarantees" the bandwidth it allocates for a specific peripheral. In addition, asynchronous support

for devices like joysticks, mice and printers is also available. The bus supplies 5V power, eliminating bulky AC power packs for devices with modest power needs.

USB is designed to add little, if any, to the cost of conventional port circuits. To achieve its low cost, the bus takes advantage of the host PC's processing power. The host detects whenever devices are added or removed, and automatically determines which host resources, such as software drivers, each peripheral needs. USB makes "one connector fits all" a reality (like connecting various modules of a hi-fi system) and lowers the cost of cables and connectors. USB drivers will be included in Windows® and Windows® NT. The hardware aspect of USB will be integrated in Intel's future PCI chip-sets and microcontroller products. This will allow broad level support from system and peripheral manufacturers.

For information on USB technology, please access Intel's home page on the World Wide Web at:
<http://www.intel.com>

For more specific information on USB, please refer to the following web sites:
<http://www.intel.com/pc-supp/platform.html>
 or <http://www.teleport.com/~usb/>

For USB inquiries, please send Email to:
USB@fes.fm.intel.com.

TECHNOLOGY IMPLEMENTERS[†]:

Compaq, Digital Equipment Corporation, IBM, Intel Corporation, Microsoft, NEC, Northern Telecom

[†]Partial list

intel.